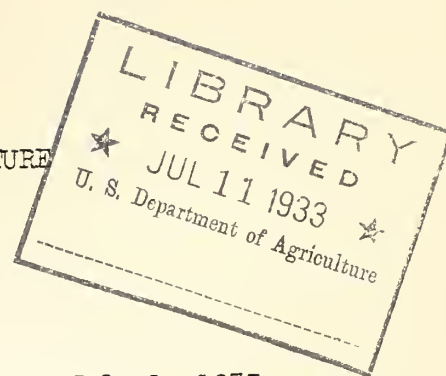


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UNITED STATES DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
Washington



Office of the Chief

July 1, 1933.

CIRCULAR

INSTRUCTIONS FOR REPORTING PILOT BALLOON OBSERVATIONS

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- I General instructions.
 - II Instructions for Preparing Pilot Balloon Reports for Transmission
in English Units on Radio and Teletype Circuits.
 - III Instructions for Preparing Pilot Balloon Reports for Transmission
in English Units by Telegraph.

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Section I

GENERAL INSTRUCTIONS

1. Due to the increasing use of Government teletype and radio facilities and the absolute necessity to reduce expenses wherever possible, it has been decided to establish a uniform system of reporting pilot balloon observations for all uses. The new system is based, in general, on the present system in use for reporting these data in English units along the airways and will be effective with the first observation on July 1, 1933.
2. The Circular, "Change from 'Surface' to 'Sea Level' as a Base for Wind Aloft Reports", dated December 1, 1931, and the 1930 Aerological Code are hereby revoked.
3. Collections of the reports will be made in sequence on teletype and radio circuits for the regular 6:30 a.m. and p.m. observations, i.e., the reports available from stations on any one circuit will be placed thereon in regular order from one end of the circuit to the other, e.g., the reports on the Cheyenne-Omaha circuit from Cheyenne, North Platte and Omaha would be run in that order, or vice versa. These sequences will begin at 7:10 a.m. and p.m., E.S.T., and run through the ensuing four minutes. Relays will then be made in accordance with a schedule now arranged between the Department of Commerce and the Weather Bureau in such a way as to insure receipt at San Francisco of practically all reports west of Chicago, and practically all reports in the country at Chicago and Washington. Other stations will of course receive a proportionately larger volume of data under this system than has been received heretofore. However, it should be clearly understood that this system of collection applies only to the regular 6:30 a.m. and p.m., E.S.T. observations and not to noon and midnight runs. These latter will continue to be transmitted and collected as

at present, except that, of course, the method prescribed in this Circular will be followed.

4. As the above schedule may require earlier filing of reports at some stations than has been the rule heretofore, station officials are authorized to permit the starting of observations not earlier than 5:30 a.m. and p.m., E.S.T. However, as will be seen from the following instructions, the new method of reporting the observations will permit, in the case of runs where two qualified observers are working together, the working up and filing of the message by the recorder after a height of 20,000 feet has been reached, while the observation is continued by the observer. This system should be used whenever practicable.

5. In order that all possible reports may be included in the teletype and radio circuit sequences, stations now telegraphing reports direct to Chicago, San Francisco and Washington at 6:30 a.m. and p.m., E.S.T., will discontinue this, effective July 1, 1933, and telegraph on and after that date to "Airways Observer" at the points indicated below:

To Atlanta:	To Cleveland:	To Newark:
Tampa.	Saulte Saint Marie	Burlington.
To Cheyenne:	Knoxville	To St. Paul:
Havre	To Dallas:	Bismarck
Modena	Brownsville	Pembina.
Sheridan.	Del Rio.	

Reports now being forwarded to the Forecast Centers at New Orleans and Denver will be continued, but prepared, of course, in the form described herein.

6. The Department of Commerce will issue instructions for the running of the sequences as regards individual circuits. The telegraphed reports received as indicated in paragraph 4 should therefore be placed in the sequence in ac-

cordance with these instructions and possibly after discussion with the Department of Commerce official concerned.

7. Reports from stations located at points where two or more circuits terminate will be included in all sequences on circuits terminating there.

8. Reports telegraphed to points as outlined in paragraph 5 above, will be filed so as to reach those points not later than 7 a.m. and p.m., E.S.T.

9. Reports received by telegraph at points outlined in paragraph 4 above will be immediately decoded and placed in the proper teletype or radio sequences at the proper time. Officials concerned should make arrangements locally for doing this. The reports will be placed in the sequences in the exact form prescribed in Section II. This will be quite simple inasmuch as the coded reports are arranged purposely for this method. All reports thus sent by radio and teletype will be in the same form, with the exception that in the teletype transmissions arrows for direction will be used while the regular abbreviations will be used in radio transmission, as explained in Section II.

10. In the event that it is not practicable to forward reports in the regular sequences on radio and teletype circuits, as outlined herein, by reason of teletype or radio failure, the reports will then be telegraphed in code in the correct form described in Section III of this Circular to those Forecast Centers, i.e., San Francisco, Chicago and Washington, to which reports were sent by telegraph, or as an addressed, special message by radio or teletype, prior to July 1, 1933.

11. This provision should be clearly understood to apply only when such failures occur at points of origin of the reports and not to points where relays of the original report are made.

12. Where reports are received by telegraph for inclusion in sequences, as outlined in paragraph 5 above, these will also be forwarded by telegraph in case

of radio or teletype failure at point of receipt by the receiving station to the Forecast Centers to which they were telegraphed direct, prior to July 1, 1933. It shall be the duty of such receiving stations to ascertain to what Forecast Centers such reports should be retelegraphed. The Forecast Centers at New Orleans and Denver are not, of course, involved in the above.

SECTION II

INSTRUCTIONS FOR PREPARING PILOT BALLOON REPORTS FOR TRANS-

MISSION IN ENGLISH UNITS ON RADIO AND TELETYPE

CIRCUITS.

1. This section of this Circular is complete in itself and will be used as a direct guide in all cases where reports are transmitted by radio or teletype, effective July 1, 1933.

2. Wind aloft data and clouds will be given in altitudes above sea level. Directions will be given to sixteen points of the compass. Velocities will be given in miles per hour. Code will not be used.

SPECIAL NOTE: In cases where reports are placed by Weather Bureau personnel directly on teletype machines located on long line circuits or on local circuits connecting with long line circuits and this is practicable by reason of the machines being equipped with direction-arrows, the wind and cloud directions will be indicated by the use of the arrows on the teletype machines, as follows:

N ↓	E ←	S ↑	W →
NNE ↘	ESE ←↘	SSW ↗↑	WNW →↘
NE ↙	SE ↗	SW ↗	NW ↙
ENE ←↙	SSE ↗↑	WSW →↗	NNW ↙↘

Reports sent by Commerce operators on long line teletype circuits will be converted to that form. Thus "↘ 15" would indicate "west northwest 15",

and "6 ST CU ¹" - would indicate "6/10 strato-cumulus from the southwest", etc.

3. Reports will be transmitted in the following order:

- (a) Station designation (paragraph 4).
- (b) Time (paragraph 5).
- (c) Identification of message (paragraph 6).
- (d) Station elevation and surface wind group (paragraph 7).
- (e) Upper air data for designated levels (paragraphs 8-11).
- (f) Maximum altitude (paragraphs 12-14).
- (g) Cloud group or groups (paragraphs 15-17).

4. STATION DESIGNATION:- This will be the regular Commerce, two or three letter designation for the station concerned.

5. TIME:- This will be the local time at which the run is started and will be given on the 24-hour clock followed by the letters "ES" for Eastern Standard; "CS" for Central Standard; "MS" for Mountain Standard; or "PS" for Pacific Standard, as may be appropriate for any station transmitting reports.

6. IDENTIFICATION:- The message will be identified by the abbreviation "UA" meaning "UPPER AIR".

7. SURFACE GROUP:- This will consist of the station elevation to the nearest hundred feet followed without space or oblique by the surface wind direction and velocity. The station elevation will be given only in figures representing hundreds, the ciphers being dropped. Zero elevation will be indicated by the letter "Z" followed by an oblique if the direction abbreviation is used or not followed by an oblique if arrows are used to indicate the direction. For example, typical messages would read as follows:

WN (Washington) 0600ES UA Z/SW5 or Z ¹/₅-----

CX (Cheyenne) 1600MS UA 61N8 or 61 ¹/₈-----

Mo (Moline) 0445CS UA 6NW18 or 6 ¹/₁₈-----

8. UPPER AIR DATA:- The wind direction and velocity for the following levels above sea level will be reported by each station insofar as they are available at that station:-

1000; 2000; 3000; 4000; 5000; 6000; 7000; 8000; 10,000; 12,000 and 14,000 feet.

9. The first standard level to be reported by any station must be 500 or more feet above the sea-level elevation of the station to the nearest hundred feet. For example; if the elevation of a station above sea level is 1520 (reported as 1500) feet the first level above "surface" to be reported would be that for 2000 feet, but if the station elevation is 1560 (reported as 1600) feet, the first level reported above "surface" would be that for 3000 feet.

10. Levels will be designated in the reports by numerals only. These will indicate the number of thousands of feet for the particular levels, i.e., "1" for 1000, "2" for 2000, "14" for 14,000, etc.

11. The wind data groups will consist of the regular English abbreviations or direction arrows for wind directions followed without space or oblique by figures representing the velocity, thus "SW15" or "↘15", "NNW28" or "↖28", etc. A calm at any level will be indicated by the word "Calm" used in place of the direction and velocity group. If the data for any level are not determined or are missing the abbreviation "MISS" will be used in their place.

12. MAXIMUM ALTITUDE:- The wind direction and velocity at the maximum altitude will be reported, whenever the maximum altitude reached is 500 or more feet above a regularly reported level, up to and including the 12,000-ft. level. Above 14,000 feet the wind direction and velocity at the maximum altitude reached will be sent only if the maximum altitude exceeds the 14,000-ft.

level by 2000 or more feet, or if a marked shift in wind direction or sudden change in velocity occurs above the last standard level reported. In all cases, 20,000 feet will be considered the extreme maximum altitude to be reported.

13. The wind direction and velocity at the maximum altitude reached will be reported, whenever a marked shift in the wind direction or sudden change in velocity is observed above the highest reported standard level, even though the difference in elevation is less than 500 feet for levels below 14,000 feet and less than 2000 feet for levels above 14,000 feet.

14. The elevation of the maximum altitude will be indicated by a figure group representing only the thousands and hundreds of feet for which the data are given, i.e., the tens and units ciphers will not be sent. This group will be placed immediately before the wind direction and velocity without space or oblique, e.g., "76W 25" or "76→25" would indicate a maximum altitude of 7600 feet above sea level, the wind being from the west at 25 miles per hour; "175WNW20" or "175→20" would indicate a maximum altitude of 17,500 feet, the wind being from the west northwest at 20 miles per hour; etc.

15. CLOUDS:- The amount, type and direction of movement of clouds observed will be reported by use of the following system:

(a) The number of tenths of sky covered by each general stratum or type of clouds will be indicated by the proper figure.

(b) The type (or predominant type in a stratum) of clouds will be indicated by the following International symbols:

UPPER CLOUDS

LOWER CLOUDS

Ci -----Cirrus	STCU-----Strato-cumulus
CI ST-----Cirro-stratus	CU -----Cumulus
CI CU-----Cirro-cumulus	NB-----Nimbus
AST-----Alto-stratus	ST-----Stratus
ACU-----Alto-cumulus	CUNB-----Cumulo-nimbus.

(c) Directions of movement will be indicated by the authorized direction abbreviation, i.e., "N" or "↓" for north; "NNE" or "↘" for north northeast; "NE" or "↙" for northeast; etc. Sixteen directions will be used.

(d) Where the movement is not known or cannot be determined, the letter "U" will be used in place of the direction.

(e) Calm will be indicated by the letter "Z" used in place of the direction.

(f) If the regular direction abbreviations are used the cloud type and direction will be separated by an oblique but no oblique will be used to separate them if the direction arrows are used.

(g) Not over ten-tenths of clouds will be reported in any one observation and not more than one upper and one lower group will be sent.

(h) The highest type reported will be sent first in the message followed by the next highest, etc.

(i) Where the movement is unusually rapid the letter "R" will be sent immediately following the direction, separated or not separated therefrom by an oblique, according to whether or not the regular direction abbreviation or the direction arrows are used for indicating the directions.

16. For example; "8CIST/N" or "8CIST↓" would indicate eight-tenths of the sky covered by cirro-stratus moving from the north; "3STCU/SSE/R" or "3STCU ↘ R" would indicate three-tenths of the sky covered with strato-cumulus moving unusually rapidly from the south southeast.

17. When clouds are entered by the balloon and their height thus determined, this fact will be indicated by adding, without space or oblique figures representing the thousands and/ or hundreds of feet above sea level at which the balloon entered the clouds, to the cloud group to which it refers. Thus, "5STCU/W/65" or "5STCU -> 65" indicates five strato-cumulus from the west which the balloon entered at 6500 feet above sea level. Care should be taken to make certain that all concerned fully understand that these figures will represent height above sea level and not above surface.

18. VISIBILITY AND THUNDERSTORMS will not be included in reports.

19. NO OBSERVATION: - In case for any reason no observation is obtained this fact will be reported as follows:

- (a) Station designator (as per paragraph 4)
- (b) Time (as per paragraph 5)
- (c) Message identification group (as per paragraph 6)
- (d) Surface group (as per paragraph 7)
- (e) Reason for no observation in English
- (f) The word "NONE"
- (g) Clouds group or groups (as per paragraphs 15-17.)

For example:

CX 0400MS UA 61NE5 or "61 ↓ 5" LOW CLOUDS NONE 10ST/NE/R65 or "10ST / R65"
(cloud altitude given above sea level not surface).

20. Examples of reports follow:

Note:- Letters in first column refer to same letter and data groups given in paragraph 3.

(A).

	Data	Translation
(a).	CX-----	Cheyenne
(b).	0430MS-----	4:30 a.m., M.S.T.
(c).	UA-----	Upper Air.
(d).	61SW6-----	Station elvn. 6100.
(e).	7SW12-----	7000 feet.
	8W14-----	8000 feet.
	10W32-----	10,000 feet.
	12WNW35-----	12,000 feet.
(f).	128WNW40-----	Max. elvn. 12,800 feet.
(g).	2CI ST/W-----	2/10 cirro-stratus from the west
	2CU/SW-----	2/10 cumulus from the southwest.

Written thus with usual abbreviations:

CX 0430MS UA 61SW6 7SW12 8W14 10W32 12WNW35 128WNW40 2CI ST/W
2CU/SW.

Written thus when entered on teletype with direction arrows:

CX 0430MS UA 61↗6 7↗12 8→14 10→32 12→↘35 128↘40 2CI ST→ 2CU↗

(B).

(a).	WA-----	Washington
(b).	1830ES-----	6:30 p.m., E.S.T.
(c).	UA-----	Upper Air
(d).	Z/W7-----	Station elvn. zero.
(e).	1W11-----	1000 feet
	2W15-----	2000 feet
	3WNW15-----	3000 feet
	4NW17-----	4000 feet
	5NW18-----	5000 feet
	6NW14-----	6000 feet
(f).	65NW11-----	Max. Elvn., 6500 feet
(g).	9STCU/NW65-----	9/10 strato-cumulus from the northwest at 6500 feet.

Written thus with usual abbreviations:

WA 1830ES UA Z/W7 1W11 2W15 3WNW15 4NW17 5NW18 6NW14 65NW11
9STCU/NW65.

Written thus when entered on teletype with direction arrows:

WA 1830ES UA Z→7 1→11 2→15 3→↘15 4↘17 5↘18 6↘14
65↘11 9STCU↘65.

(c).

	Data	Translation
(a).	CV-----	Cleveland
(b).	0600ES-----	6:00 a.m., E.S.T.
(c).	UA-----	Upper Air
(d).	8E3-----	Station elvn. 800 feet.
(e).	2E8-----	2000 feet.
	3ESE4-----	3000 feet.
	4SE4-----	4000 feet.
	5SSE8-----	5000 feet.
	6SSE10-----	6000 feet.
	7S12-----	7000 feet.
	8S10-----	8000 feet.
	10SSW6-----	10,000 feet.
	12SSE9-----	12,000 feet.
	14S15-----	14,000 feet.
(f)	152NW45-----	Max. elvn. 15,200 feet, but data sent as a marked change occurred in wind direction and velocity.
(g).	6CIST/NW/R-----	6/10 cirro-stratus from the north-west, moving unusually rapidly.

Written thus with usual abbreviations:

CV 0600ES UA 8E3 2E8 3ESE4 4SE4 5SSE8 6SSE10 7S12
8S10 10SSW6 12SSE9 14S15 152NW45 6CIST/NW/R.

Written thus when entered on teletype with direction arrows:

CV 0600ES UA 8↙3 2↙8 3↙↖4 4↖4 5↖↖8 6↖↖10 7↖12
8↖10 10↖↗6 12↖↖9 14↖15 152↖45 6CIST↖R.

SECTION III

INSTRUCTIONS FOR PREPARING

PILOT BALLOON REPORTS FOR TRANSMISSION IN ENGLISH UNITS

BY TELEGRAPH

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1. This section of the Circular is complete in itself and will be used as a direct guide in all cases where reports are telegraphed, effective July 1, 1933.

2. Wind aloft data and clouds will be given in altitudes above sea level. Directions will be given to sixteen points of the compass. Velocities will be given in miles per hour. Code will be used as outlined in the following

instructions.

3. Reports will be transmitted in the following order:

- (a) Time (paragraph 4)
- (b) Station elevation (paragraph 5)
- (c) Surface data (paragraph 6)
- (d) First level designator (paragraph 7)
- (e) Upper air data for designated levels (paragraph 8)
- (f) Maximum altitude (paragraphs 10-13)
- (g) Clouds (paragraph 14)

4. TIME:- The time of beginning of the observation will be enciphered to the nearest half-hour by use of the "Ice" code on page 72 of the 1931 Weather Code, the time being on the 24-hour-clock basis. Under this system "Quacks" will indicate 12:30 a.m., "Quacknut", 6:00 a.m.; "Quandary", 12 noon; "Quaintsires" 6:30 p.m.; "Queenguide", midnight, etc.

5. STATION ELEVATION:- The station elevation, to the nearest hundred feet above sea level, will be indicated by the use of the "J" words under "Rising" on page 64 of the 1931 Weather Code, disregarding the decimal points and multiplying each figure by 100. For example; "Japan" would indicate an elevation of 200 feet; "Jamus" one of 6100 feet, etc. "Jack" will be used to indicate zero elevations.

6. SURFACE DATA:- The wind direction and velocity at the surface will immediately follow the station elevation. This and all data for upper air levels will be coded by use of the regular barometer/temperature code words on pages 20-27, inclusive, of the 1931 Weather Code using the "BA" words therein for north; "BI" for north northeast; "DA" for northeast; "DI" for east northeast; "FA" for east; "FI" for east southeast; "GA" for southeast; "GI" for south southwest; "MA" for south; "MI" for south southwest; "NA" for southwest; "NI" for west southwest; "RA" for west; "RI" for

west northwest; "SA" for northwest, and "SI" for north northwest. The word "US" will be used for calm. The velocities will be given in miles per hour in the second element of these code words, i.e., "Banging" would indicate a wind from the north at a velocity of 46 miles per hour. Only even velocities will be coded, the next lower even figure being used when the actual velocity is odd. For velocities of 100 miles an hour use the words for zero or 100° temperature, e.g., "Say" would indicate a 100-mile velocity from the northwest, etc. For velocities over one hundred miles an hour the word "ONE" will be inserted before the code word to which it refers, i.e., "ONE SAVIOR" would indicate a velocity of 106 miles an hour from the northwest.

7. FIRST LEVEL DESIGNATOR:- This will be a number in English inserted before the code word for the first level sent to indicate the altitude of that level, i.e., if the first level reported is 1000 feet insert the figure "ONE"; if 2000 feet, "TWO", if 14,000 feet, "FOURTEEN", etc.

8. UPPER AIR DATA:- The wind direction and velocity for the following levels above sea level will be telegraphed, in code (as outlined in paragraph 6), and in the order named, by each station insofar as they are available at that station:

1000; 2000; 3000; 4000; 5000; 6000; 7000; 8000; 10,000; 12,000; and 14,000 feet.

9. The first standard level to be reported by any station must be 500 or more feet above the sea-level elevation of the station to the nearest hundred feet. For example; if the elevation of a station above sea level is 1520 (reported as 1500) feet the first level above "surface" to be reported would be that for 2000 feet, but if the station elevation is 1560 (reported as 1600) feet, the first level reported above "surface" would be that for 3000 feet.

10. MAXIMUM ALTITUDE:- The elevation of the maximum altitude reached will always be sent. The wind direction and velocity at the maximum altitude will be reported, whenever the maximum altitude reached is 500 or more feet above a regularly reported level, up to and including the 12,000-ft. level. Above 14,000 feet the wind direction and velocity at the maximum altitude reached will be sent only if the maximum altitude exceeds the 14,000-ft. level by 2000 or more feet, or if a marked shift in wind direction or sudden change in velocity occurs above the last standard level reported. In all cases, 20,000 feet will be considered the extreme maximum altitude to be reported.

11. The wind direction and velocity at the maximum altitude reached will be reported, whenever a marked shift in the wind direction or sudden change in velocity is observed above the highest reported standard level, even though the difference in elevation is less than 500 feet for levels below 14,000 feet and less than 2000 feet for levels above 14,000 feet.

12. Maximum altitude above sea level, telegraphed in accordance with paragraphs 10 and 11, will be indicated by a code word taken from the "River" code under "Falling" on pages 65-70 of the 1931 Weather Code and entered immediately before the wind direction and velocity code word for the maximum altitude data. The figure coded will represent the thousands and hundreds places only, it being necessary to multiply them by 100 to arrive at the proper actual figure. For example, under the system "TUEICANI" would indicate a maximum altitude of 3600 feet; "TUTARY" one of 9200 feet; "TANNIN" one of 16,600 feet, etc.

13. The wind direction and velocity at the maximum altitude will be coded in the same manner as prescribed foregoing for other levels reported.

14. CLOUDS:- The amount, type and direction of movement of clouds observed will be reported in code in accordance with following:-

(a) The regular cloud code words on pages 59 and 60 of the 1931 Weather Code will be used except that the following words will be used for "Calm and "Unknown":

CALM.

Cloud Type.	1/10 or less.	2 or 3 tenths	4 or 5 tenths	6 or 7 tenths	8,9, or 10 tenths
Ci or Ci St	Cull	Curval	Curley	Cupid	Cuckoo
CCI Cu or A Cu	Catch	Calvar	Cake	Caking	Callow
A St.	Cent	Cellar	Celeste	Ceiling	Cesspool
Cu	Circum	Cicula	Cicero	Cilium	Cinco
St Cu	Cocky	Collar	Copper	Coppice	Coco
St	Chilly	Choppage	Chopper	Cranking	Chico
Nb or Cu Nb.	Clanky	Clovak	Clapper	Cranking	Crimpole
UNKNOWN.					
Ci or Ci St.	Cuzzy	Cuzald	Cuzel	Cuzilt	Cuzolp
Ci Cu or A Cu.	Cazy	Calzan	Cazell	Cazif	Cazole
A St.	Cezule	Cezave	Cezery	Cozist	Cezode
Cu.	Cirzule	Cizalm	Cilzer	Cipzil	Cilzor
St. Cu.	Cozup	Cozate	Cozener	Cozine	Cozorp
St.	Chozy	Chizam	Chazel	Chezipe	Chazop
Nb or Cu Nb.	Clazule	Clazart	Crazed	Clezir	Crazol

(b) Only one code word for upper and only one for lower clouds will be sent in any one observation, the predominant type and total amount of types of sky covered by all upper or lower clouds being enciphered in the code words for the respective groups.

(c). Not over ten-tenths of clouds will be reported in any observation.

(d) When both upper and lower clouds are reported the code word for the upper clouds will precede that for the lower clouds.

(e) Less than one-tenths of clouds of any type will not be reported, except when these may be entered by the balloon, in which case they are to be reported.

(f) When the movement of the clouds is unusually rapid, this fact will be indicated by adding "S" to the code word, except when the latter ends in "X" or "H", when "ES" will be added.

(g) When clouds are entered by the balloon and their height thus determined, this fact will be indicated by the entry of a code word, taken from the "River" code under "Falling" on pages 65-70 of the 1931 Weather Code (as prescribed for indicating maximum altitudes in paragraph 12 above,) immediately following the cloud code word to which it refers. For example, "COMING TURNABLES" would indicate 6/10 strato-cumulus from the south at an altitude (determined by the balloon entering them) of 9300 feet above sea level.

(h) Whenever the cloud elevation and maximum altitude reached are identical, the same altitude code word will be used at the proper places in the message.

15. VISIBILITY and THUNDERSTORMS will not be included in these reports.

16. NO OBSERVATION:- In case no observation is obtained for any reason the following will be telegraphed:-

- (a) Time (coded as per paragraph 4)
- (b) Station elevation (coded as per paragraph 5)
- (c) Surface data (coded as per paragraph 6)
- (d) Reason for no observation in plain English
- (e) The word "None"
- (f) Clouds, if any (coded as per paragraph 14)
- (g) Cloud altitude above sea level if determined (coded as per paragraph 14).

For example using the same example as given under paragraph 19 of Section II:

QUACKGOLD JANUS DALE LOW CLOUDS NONE CHALDONS TUNNELS.

17. Examples of reports follow:

Note:- Since these reports will be telegraphed, the station of origin will be shown in the superscript and it is not necessary to repeat this in the body of the message. Also, the reports are easily identified and no special identification word seems necessary. When decoded and placed on the teletype circuits, however, these items will be entered by the official decoding the message in the proper order prescribed in Section II.

Note:- Letters in first columns below refer to same letters and data groups given in paragraph 3.

(A).	Code Word	Translation
(a).	QUACKGIVERS-----	4:30 a.m., local time.
(b).	JANUS-----	Station elvn. 6100 feet.
(c).	NAPKIN-----	Surface, southwest six.
(d).	SEVEN-----	First level, 7000 feet.
(e).	NAILBALL-----	7000 feet, southwest twelve.
	RASPBERRY-----	8000 feet, west fourteen.
	RAFAEL-----	10,000 feet, west thirty two.
	RI FENESS-----	12,000 feet, west northwest thirty four.
(f).	TADDE-----	Max. elvn., 12,400 feet, (no wind data as elevation less than 500 feet above last reg- ular level. This would <u>not</u> be entered in decoded report placed on teletype).
(g).	CURATE-----	2/10 cirro-stratus, west.
	CINNAMON-----	2/10 cumulus, southwest.

Written in body of telegraph message thus:

QUACKGIVERS JANUS NAPKIN SEVEN NAILBALL RASPBERRY RAFAEL
RIFENESS TADDE CURATE CINNAMON.

(B).	Code Word	Translation
(a).	QUAINTSIRES-----	6:30 p.m., local time.
(b).	JACK-----	Station elvn., zero.
(c).	RACING-----	Surface, west six.
(d).	ONE-----	First level, 1000 feet.
(e).	RAMEUSE-----	1000 feet, west ten.
	RASPBERRY-----	2000 feet, west fourteen.
	RIBBED-----	3000 feet, west northwest fourteen.
	SABINE-----	4000 feet, northwest sixteen.
	SAMBO-----	5000 feet, northwest eighteen.
	SABER-----	6000 feet, northwest fourteen.
(f).	TUNNELS-----	Max. elvn., 6500 feet.
	SABULA-----	Wind at max. alt., northwest ten.
(g).	CONSORT-----	8/10 strato-cumulus, north- west.
	TUNNELS-----	Cloud altitude as determined by balloon entering them, 6500 feet.

Written in body of telegraph message thus:

QUAINTSIRES JACK RACING ONE RAMEUSE RASPBERRY RIBBED SABINE
SAMBO SABER TUNNELS SABULA CONSORT TUNNELS.

(c).	QUACKNUT-----	6:00 a.m., local time.
(b).	JASPOID-----	Station elvn., 800 feet.
(c).	FACADE-----	Surface, east two.
(d).	TWO-----	First level, 2000 feet.
(e).	FAVOR-----	2000 feet, east eight.
	FILE-----	3000 feet, east southeast. four.
	GALENA-----	4000 feet, southeast four.
	GILLOTE-----	5000 feet, south southeast eight.
	GILBY-----	6000 feet, south southeast ten.
	MARBACH-----	7000 feet, south twelve.
	MALTBY-----	8000 feet, south ten.
	MILITARY-----	10,000 feet, south southwest six.
	GILLOTE-----	12,000 feet, south southeast eight.
	MAYBE-----	14,000 feet, south fourteen.

(C) continued:

	Code Word	Translation
(f).	TAMABLE-----	Max. alt., 15,200 feet.
	SAGE-----	Wind at max. alt., northwest forty four. This data sent as marked change in direction and velocity occurred at less than 2000 feet above the 14,000-ft. level.
(g).	CURSINGS-----	6/10 cirro-stratus, northwest, moving unusually rapidly.

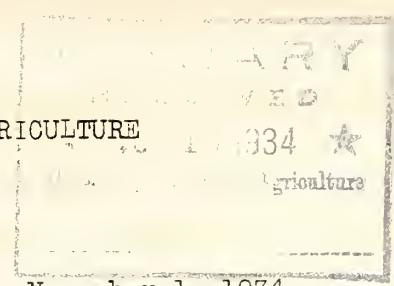
Written in body of telegraph message thus:

QUACKNUT JASPOID FACADE TWO FAVOR FILE GALENA GILLOTE
GILBY MARRACH MALTBY MILITARY GILLOTE MAYBE TAMABLE
SAGE CURSINGS.

C. F. Marvin,
Chief of Bureau.

W37 Int

UNITED STATES DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
Washington



Office of the Chief

November 1, 1934.

CIRCULAR

APPENDIX TO CIRCULAR DATED JULY 1, 1933,
ENTITLED "INSTRUCTIONS FOR REPORTING
PILOT BALLOON OBSERVATIONS"

Since the odd thousand-foot levels now included in pilot balloon reports are not used generally by District Forecast or 4-hourly forecast centers and are considered of little additional value to these reports, it has been decided to eliminate them and thereby save considerable transmission time on the teletype circuits.

In order to retain in these reports, all data possible near the surface, the rule specifying that the first standard level to be reported must be 500 or more feet above the station elevation will be changed to read "100 or more feet above the station elevation."

The effective date for these instructions is November 15, 1934.

To put the above changes in effect, all stations having copies of the Circular dated July 1, 1933, are requested to correct them as follows:

1. Page 6, paragraph 8 and page 13, paragraph 8 - delete 1000; 3000; 5000 and 7000.
2. Page 6, paragraph 9 and page 13, paragraph 9 - end of first line, change 500 to 100; line 4, change 1520 to 1920 and 1500 to 1900; line 5, change 1560 to 1960; line 6, change 1600 to 2000; line 6 on page 6, and line 7 on page 13, change 3000 to 4000.
3. Page 6, paragraph 10 - delete "1" for 1000.
4. Page 10, example (A) - opposite (c), delete "72W12---

7000 feet" and in abbreviated message forms delete 7SW12 and 7⁷ 12.

5. Page 10, example (B) - under (e), delete "1W11-----
1000 feet", "3WNW15-----3000 feet" and "5NW18-----5000 feet"
and in abbreviated message forms, delete 1W11, 3WNW15, 5NW18,
1→11, 3→15 and 5↘18.

6. Page 11, example (C) - under (e), delete "3ESE4-----
3000 feet", "5SSE8-----5000 feet" and "7S12-----7000 feet"
and in abbreviated message forms, delete 3ESE4, 5SSE8, 7S12,
3↙4, 5↑↘8, and 7↑12.

7. Page 13, paragraph 7 - line 3, change 1000 to 2000;
line 4, delete "ONE; if 2000 feet,".

8. Page 17, example (A) - opposite (d), change SEVEN to
EIGHT and 7000 to 8000; opposite (e), delete "NAILBALL -----
7000 feet, southwest twelve".

9. Page 18, sample message at top of page - change
SEVEN to EIGHT and delete "NAILBALL".

10. Page 18, example (B) - opposite (d), change ONE to
TWO and 1000 to 2000; under (e), delete "RAMBUSE ----- 1000 feet,
west ten," "RIBBED-----3000 feet, west northwest fourteen,"
and "SAMBO-----5000 feet, northwest eighteen;" in sample
message, change ONE to TWO and delete words RAMBUSE, RIBBED
and SAMBO.

11. Page 18, example (C) - under (e), delete "File -----
3000 feet, east southeast four," "GILLOTE-----5000 feet, south
southeast eight" and MARBACH ----- 7000 feet, south twelve.

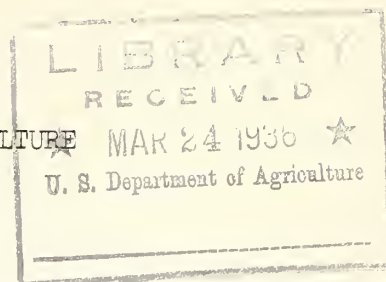
12. Page 19, example (C) - in sample message, delete words
FILE, GILLOTE, and MARBACH.

1.9
W. J. Went

UNITED STATES DEPARTMENT OF AGRICULTURE

WEATHER BUREAU

Washington



Office of the Chief

February 1, 1936.

CIRCULAR

INSTRUCTIONS FOR REPORTING PILOT BALLOON OBSERVATIONS

- I. General Instructions.
- II. Instructions for Preparing Pilot Balloon Reports for
Transmission in English Units on Radio and Tele-
type Circuits.
- III. Instructions for Preparing Pilot Balloon Reports for
Transmission in English Units by Telegraph.

SECTION I

GENERAL INSTRUCTIONS

1. These instructions supersede similar instructions in Circulars dated July 1, 1933, November 1, 1934, October 1, 1935, and October 15, 1935, respectively; also instructions relative to reporting "no observation" in Circulars dated July 10, 1935 and July 23, 1935, respectively and paragraph 6 of Circular dated July 10, 1935. The effective date for these instructions is February 1, 1936.

2. Collections of the reports will be made in sequence on teletype and radio circuits for the regular 5:00 a.m. and 5:00 p.m., E. S. T. observations; the reports from stations on any one circuit being placed thereon in regular geographical order from one end of the circuit to the other. Relays, for the purpose of making the maximum number of reports available to airway and District forecast centers, will then be made in accordance with the schedule now arranged between the Department of Commerce and the Weather Bureau.

3. In order that all reports may be filed promptly, station officials are authorized to permit the starting of observations as early as 4:30 a.m. and p.m. E. S. T.

4. Off-airway pilot balloon stations at which no radio or teletype facilities are available, are to continue telegraphing their reports to nearby teletype relay points as heretofore and are to add the following coded data to their 5:00 a.m. and 5:00 p.m. E. S. T. reports when (1) no observation is made due to adverse weather or (2) the observation extends to only the

first level above the surface:

- (a) Barometer - temperature (from pages 19 to 28 of the 1931 Weather Code)
- (b) Wind direction - state of weather - wind velocity (from pages 28 to 36 of the 1931 Weather Code)
- (c) Ceiling - visibility - dew point (paragraphs 10 to 20 of Circular dated November 15, 1932, entitled "Changes in Airways Service for the Purpose of Effecting Economies")

When Department of Commerce radio or teletype facilities are installed at any pilot balloon station and the sending of hourly reports is begun, the addition of the above code words to such reports is to be discontinued.

5. Reports telegraphed to teletype points as outlined in 4 above, will be filed so as to reach these points not later than 6:00 a.m. and p.m. E. S. T.

6. Reports received by telegraph at points outlined in paragraph 4 above will be immediately decoded and placed in the proper teletype or radio sequences at the proper time. Officials concerned should make arrangements locally for doing this. The reports will be placed in the sequences in the exact form prescribed in Section II. This will be quite simple inasmuch as the coded reports are arranged purposely for this method. All reports thus sent by radio and teletype will be in the same form, with the exception that in the teletype transmissions arrows for

direction will be used while the regular abbreviations will be used in radio transmission, as explained in Section II.

7. In the event that it is not practicable to forward reports in the regular sequences on radio and teletype circuits, as outlined herein, by reason of teletype or radio failure, the reports will then be telegraphed in code in the correct form described in Section III of this Circular to those Forecast Centers, i. e., San Francisco, Chicago and Washington, to which reports were formerly sent by telegraph; or as an addressed, special message by radio or teletype, prior to July 1, 1933.

8. This provision should be clearly understood to apply only when such failures occur at points of origin of the reports and not to points where relays of the original report are made.

9. Where reports are received by telegraph for inclusion in sequences, as outlined in paragraph 4 above, these will also be forwarded by telegraph in case of radio or teletype failure at point of receipt by the receiving station to the Forecast Centers to which they were telegraphed direct, prior to July 1, 1933. It shall be the duty of such receiving stations to ascertain to what Forecast Centers such reports should be retelegraphed. The Forecast Center at New Orleans is not, of course, involved in the above.

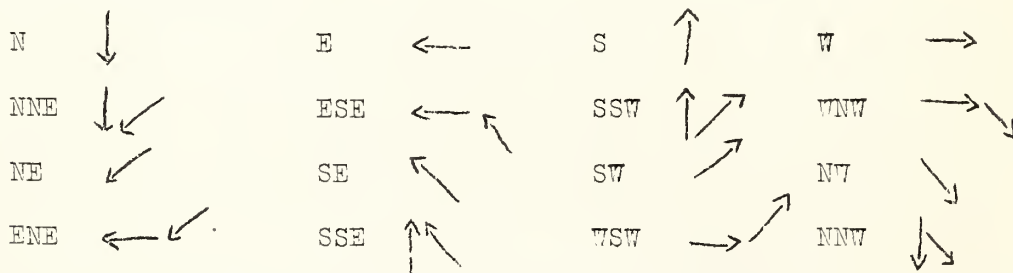
SECTION II

INSTRUCTIONS FOR PREPARING PILOT BALLOON REPORTS FOR TRANS-
MISSION IN ENGLISH UNITS ON RADIO AND TELETYPE
CIRCUITS.

1. This section of this Circular is complete in itself and will be used as a direct guide in all cases where reports are transmitted by radio or teletype, effective February 1, 1936.

2. Wind aloft data and clouds will be given in altitudes above sea level. Directions will be given to sixteen points of the compass. Velocities will be given in miles per hour. Code will not be used.

SPECIAL NOTE:- In cases where reports are placed by Weather Bureau personnel directly on teletype machines located on long line circuits or on local circuits connecting with long line circuits and this is practicable by reason of the machines being equipped with direction-arrows, the wind and cloud directions will be indicated by the use of the arrows on the teletype machines as follows:



Reports sent by Commerce operators on long line teletype circuits will be converted to that form. Thus "→↘15" would indicate "west northwest 15", and "6 ST CU ↗" would indicate "6/10 strato-cumulus from the southwest", etc.

3. Reports will be transmitted in the following order:

- (a) Station designation (paragraph 4).
- (b) Time (paragraph 5).
- (c) Station elevation and surface wind group (paragraph 7).
- (d) Upper air data for designated levels (paragraphs 8-11).
- (e) Maximum altitude (paragraphs 12-14).
- (f) Cloud group or groups (paragraphs 15-17).

4. STATION DESIGNATION:- This will be the regular Commerce two or three letter designation for the station concerned.

5. TIME:- Eastern Standard Time will be used for all pilot balloon reports and will be determined as follows: Add 20 minutes to the time of releasing the balloon. Change this to nearest whole hour. Convert to Eastern Standard Time. Use 0-23 hour basis. For example: Denver, Colo., balloon released, 3:12 p.m., Mountain Standard Time. Adding 20 minutes gives 3:32 p.m. Changing to Eastern Standard Time gives 5:32 p.m. Changing to the nearest whole hour on the 0-23 hour basis gives 18. Thus, this will be indicated in the message as follows:

DV 18. The purpose of adding 20 minutes to the time of the balloon's release is to indicate more nearly the mean time of the observation. Weather Bureau observers in filing these reports with local Department of Commerce operators for transmission will furnish these operators the local standard time of the balloon's release, plus 20 minutes, so that the broadcasts will indicate

the local mean time in minutes.

6. SURFACE GROUP:- This will consist of the station elevation to the nearest hundred feet followed without space or oblique by the surface wind direction and velocity. The station elevation will be given only in figures representing hundreds, the ciphers being dropped. Zero elevation will be indicated by the letter "Z" followed by an oblique if the direction abbreviation is used or not followed by an oblique if arrows are used to indicate the direction. For example, typical messages would read as follows:

WA (Washington) 05 Z/SW5 or Z ↗ 5_____

CX (Cheyenne) 17 61N8 or 61 ↓ 8_____

DAV(Davenport) 05 6NW18 or 6 ↙ 18_____

7. UPPER AIR DATA:- The wind direction and velocity for the following levels above sea level will be reported by each station insofar as they are available at that station:-

2000; 4000; 6000; 8000; 10,000; 12,000 and
14,000 feet.

8. The first standard level to be reported by any station must be 100 or more feet above sea-level elevation of the station to the nearest hundred feet. For example: if the elevation of a station above sea level is 1920 (reported as 1900) feet, the first level above "surface" to be reported would be that for 2000 feet, but if the station elevation is 1960 (reported as 2000) feet, the first level reported above "surface" would be that for 4000 feet.

9. Levels will be designated in the reports by numerals only. These will indicate the number of thousands of feet for the particular levels, i. e., "2" for 2000, "14" for 14,000, etc.

10. The wind data groups will consist of the regular English abbreviations or directions arrows for wind directions followed without space or oblique by figures representing the velocity, thus "SW15" or "↘15", "NNW28" or "↙28", etc. A calm at any level will be indicated by the word "Calm" used in place of the direction and velocity group. If the data for any level are not determined or are missing the abbreviation "MISC" will be used in their place.

11. MAXIMUM ALTITUDE:- The wind direction and velocity at the maximum altitude will be reported, whenever the maximum altitude reached is 500 or more feet above a regularly reported level, up to and including the 12,000-ft. level. Above 14,000 feet the wind direction and velocity at the maximum altitude reached will be sent only if the maximum altitude exceeds the 14,000 ft. level by 2000 or more feet, or if a marked shift in wind direction or sudden change in velocity occurs above the last standard level reported. In all cases, 20,000 feet will be considered the extreme maximum altitude to be reported.

12. The wind direction and velocity at the maximum altitude reached will be reported, whenever a marked shift in the wind direction or sudden change in velocity is observed above the highest reported standard level, even though the difference in elevation is less than 500 feet for levels below 14,000 feet and less than 2000 feet for levels above 14,000 feet.

13. The elevation of the maximum altitude will be indicated by a figure group representing only the thousands and hundreds of feet for which the data are given, i. e., the tens and units cipher will not be sent. This group will be placed immediately before the wind direction and velocity without space or oblique, e. g., "76W25" or "76->25" would indicate a maximum altitude of 7600 feet above sea level, the wind being from the west at 25 miles per hour; "175WNW20" or "175->20" would indicate a maximum altitude of 17,500 feet, the wind being from the west northwest at 20 miles per hour; etc.

14. CLOUDS:- The amount, type and direction of movement of clouds observed will be reported by use of the following system:

(a) The number of tenths of sky covered by each general stratum or type of clouds will be indicated by the proper figure.

(b) The type (or predominant type in a stratum) of clouds will be indicated by the following International symbols:

<u>UPPER CLOUDS</u>	<u>LOWER CLOUDS</u>
Ci-----Cirrus	STCU-----Strato-cumulus
CIST-----Cirro-stratus	MCU-----Mammato-cumulus
CICU-----Cirro-cumulus	CU-----Cumulus
AST-----Alto-stratus	NB-----Nimbus
ACU-----Alto-cumulus	St-----Stratus
ACC-----Alto-cumulus-castellatus	CUNB-----Cumulo-nimbus
	FRST-----Fracto-stratus

(c) Directions of movement will be indicated by the authorized direction abbreviations, i. e., "N" or "↯" for north; "NNE" or "↘" for north northeast; "NE" or "↙" for northeast; etc. Sixteen directions will be used.

(d) Where the movement is not known or cannot be determined, the letter "U" will be used in place of the direction.

(e) Calm will be indicated by the letter "Z" used in place of the direction.

(f) If the regular direction abbreviations are used the cloud type and direction will be separated by an oblique but no oblique will be used to separate them if the direction arrows are used.

(g) Not over ten-tenths of clouds will be reported in any one observation and not more than one upper and one lower group will be sent.

(h) The highest type reported will be sent first in the message followed by the next highest, etc.

(i) Where the movement is unusually rapid the letter "R" will be sent immediately following the direction, separated or not separated therefrom by an oblique, according to whether or not the regular direction abbreviation or the direction arrows are used for indicating the directions.

15. For example: "8CIST/N" or "8CIST↓" would indicate eight-tenths of the sky covered by cirro-stratus moving from the north; "3STCU/SSE/R" or "3STCU↗R" would indicate three-tenths of the sky covered with strato-cumulus moving unusually rapidly from the south southeast.

16. When clouds are entered by the balloon and their height thus determined, this fact will be indicated by adding, without space or oblique, figures representing the thousands and/or hundreds of feet above sea level at which the balloon entered the clouds, to the cloud group to which it refers. Thus, "5STCU/W/65"

or "5STCU → 65" indicates five strato-cumulus from the west which the balloon entered at 6500 feet above sea level. Care should be taken to make certain that all concerned fully understand that these figures will represent height above sea level and not above surface.

17. NO OBSERVATION:- In case for any reason no observation is obtained, this fact will be reported as follows:

- (a) Station designator (as per paragraph 4)
- (b) Time (as per paragraph 5)
- (c) Surface group (as per paragraph 7)
- (d) Reason for no observation in English
- (e) The word "NONE"
- (f) Cloud group or groups (as per paragraphs 15-17)

For example:

CX 05 61NE5 or "61✓ 5" LOW CLOUDS NONE 10ST/NE/R65 or "10ST✓R65"
(cloud altitude given above sea level not surface).

18. Examples of reports follow:

Note:- Letters in first column refer to same letter and data groups given in paragraph 3.

(A).

Data	Translation
(a). CX-----	Cheyenne
(b). 05-----	5:00 a. m., E. S. T.
(c). 61SW6-----	Station elvn. 6100.
(d). 8W14-----	8000 feet
10W32-----	10,000 feet
12WNW35-----	12,000 feet
128WNW40-----	Max. elvn. 12,800 feet.
2CIST/W-----	2/10 cirro-stratus from the west.
2CU/SW-----	2/10 cumulus from the southwest.

Written thus with usual abbreviations:

CX 05 61SW6 8W14 10W32 12WNW35 128WNW40 2CIST/W 2CU/SW.

Written thus when entered on teletype with direction arrows:

CX 05 61↗6 8→14 10→32 12↘35 128↘40 2CIST→2CU↗.

(B).

(a). WA-----	Washington
(b). 17-----	5:00 p. m., E. S. T.
(c). Z/W7-----	Station elevn. zero.
(d). 2W15-----	2000 feet
4NW17-----	4000 feet
6NW14-----	6000 feet
(e). 65NW11-----	Max. Elvn., 6500 feet
(f). 9STCU/NW65-----	9/10 strato-cumulus from the northwest at 6500 feet.

Written thus with usual abbreviations:

WA 17 Z/W7 2W15 4NW17 6NW14 65NW11 9STCU/NW65.

Written thus when entered on teletype with direction arrows:

WA 17 Z↖7 2→15 4↘17 6↘14 65↘11 9STCU↘65.

(c).

Data	Translation
(a). CV-----	Cleveland
(b). 05-----	5:00 a. m., E. S. T.
(c). 8E3-----	Station elvn. 800 feet.
(d). 2E8-----	2000 feet.
4SE4-----	4000 feet.
6SSE10-----	6000 feet.
8S10-----	8000 feet.
10SSW6-----	10,000 feet.
12SSE9-----	12,000 feet.
14S15-----	14,000 feet.
(e). 152NW45-----	Max. elvn. 15,200 feet, but data sent as a marked change occurred in wind direction and velocity.
(f). 6CIST/NW/R-----	6/10 cirro-stratus from the north-west, moving unusually rapidly.

Written thus with usual abbreviations:

CV 05 8E3 2E8 4SE4 6SSE10 8S10 10SSW6 12SSE9
14S15 152NW45 6CIST/NW/R.

Written thus when entered on teletype with direction arrows:

CV 05 8←3 2←8 4↖4 6↗10 8↑ 10 10↗ 6
12↗ 9 14↑ 15 152↘ 45 6CIST↘ R.

SECTION III

INSTRUCTIONS FOR PREPARING

PILOT BALLOON REPORTS FOR TRANSMISSION IN ENGLISH UNITS

BY TELEGRAPH

1. This section of the Circular is complete in itself and will be used as a direct guide in all cases where reports are telegraphed, effective January 15, 1936.

2. Wind aloft data and clouds will be given in altitudes above sea level. Directions will be given to sixteen points of the compass. Velocities will be given in miles per hour. Code will be used as outlined in the following instructions.

3. Reports will be transmitted in the following order:

- (a) Time (paragraph 4)
- (b) Station elevation (paragraph 5)
- (c) Surface data (paragraph 6)
- (d) First level designator (paragraph 7)
- (e) Upper air data for designated levels (paragraph 8)
- (f) Maximum altitude (paragraphs 10-12)
- (g) Clouds (paragraph 14)

4. TIME:- The time of the observation will be enciphered to the nearest hour E. S. T., by use of every second word of the "Ice" code on page 72 of the 1931 Weather Code, the time being on the 0-23 hour-clock basis. Under this system "QUACKMASTER" will indicate 5:00 a. m.; "QUABER", 11:00 a. m.; "QUARANTE", 5:00 p. m.; "QUELFIG", 11:00 p. m.; "QUEENGUIDE", midnight, etc. In determining the time of the observation, add 20 minutes to the time of releasing the balloon, change this to the nearest whole hour and then convert to Eastern Standard Time. For example: Denver, Colo., balloon released, 3:12 p. m., M. S. T., adding 20 minutes gives 3:32 p. m. Changing to Eastern Standard Time gives 5:32 p. m. Changing to the nearest whole hour on the 0-23 hour basis gives 18. Thus this time will be indicated in the message as DV 18.

5. STATION ELEVATION:- The station elevation, to the nearest hundred feet above sea level, will be indicated by the use of the "J" words under "Rising" on page 64 of the 1931 Weather Code, disregarding the decimal points and multiplying each figure by 100. For example: "Japan" would indicate an elevation of 200 feet; "Janus" one of 6100 feet, etc. "Jack" will be used to indicate zero elevations.

6. SURFACE DATA:- The wind direction and velocity at the surface will immediately follow the station elevation. This and all data for upper air levels will be coded by use of the regular barometer/temperature code words on pages 20-27, inclusive, of the 1931 Weather Code using the "BA" words therein for north; "BI" for north northeast; "DA" for northeast; "DI" for east northeast; "EA" for east; "FI" for east southeast; "GA" for southeast; "GI" for south southeast; "MA" for south; "MI" for south southwest; "NA" for southwest; "NI" for west southwest; "RA" for west; "RI" for west northwest; "SA" for northwest, and "SI" for north northwest. The word "US" will be used for calm. The velocities will be given in miles per hour in the second element of these code words, i. e., "Banging" would indicate a wind from the north at a velocity of 46 miles per hour. Only even velocities will be coded, the next lower even figure being used when the actual velocity is odd. For velocities of 100 miles an hour use the words for zero or 100° temperature, e. g., "Say" would indicate a 100-mile velocity from the northwest, etc. For velocities over one hundred miles an hour the word "ONE" will be inserted before the code word to which it refers, i. e., "ONE SAVIOR" would indicate a velocity of 106 miles an hour from the northwest.

7. FIRST LEVEL DESIGNATOR:- This will be a number in English inserted before the code word for the first level sent to indicate the altitude of that level, i. e., if the first level reported is 2000 feet insert the figure "TWO"; if 6000 feet, "SIX", etc.

8. UPPER AIR DATA:- The wind direction and velocity for the following levels above sea level will be telegraphed, in code (as outlined in paragraph 6), and in the order named, by each station insofar as they are available at that station:

2000; 4000; 6000; 8000; 10,000; 12,000; and 14,000 feet.

9. The first standard level to be reported by any station must be 100 or more feet above the sea-level elevation of the station to the nearest hundred feet. For example; if the elevation of a station above sea level is 1920 (reported as 1900) feet, the first level above "surface" to be reported would be that for 2000 feet, but if the station elevation is 1960 (reported as 2000) feet, the first level reported above "surface" would be that for 4000 feet.

10. MAXIMUM ALTITUDE:- The elevation of the maximum altitude reached will always be sent. The wind direction and velocity at the maximum altitude will be reported, whenever the maximum altitude reached is 500 or more feet above a regularly reported level, up to and including the 12,000-ft. level. Above 14,000 feet the wind direction and velocity at the maximum altitude reached will be sent only if the maximum altitude exceeds the 14,000 ft. level by 2000 or more feet, or if a marked shift in wind direction or sudden change in velocity occurs above the last standard level reported. In all cases, 20,000 feet will be considered the extreme maximum altitude to be reported.

11. The wind direction and velocity at the maximum altitude reached will be reported, whenever a marked shift in the wind direction or sudden change in velocity is observed above the highest reported standard level, even though the difference in elevation is less than 500 feet for levels below 14,000 feet and less than 2000 feet for levels above 14,000 feet.

12. Maximum altitude above sea level, telegraphed in accordance with paragraphs 10 and 11, will be indicated by a code word taken from the "River" code under "Falling" on pages 65-70 of the 1931 Weather Code and entered immediately before the wind direction and velocity code word for the maximum altitude data. The figure coded will represent the thousands and hundreds places only, it being necessary to multiply them by 100 to arrive at the proper actual figure. For example, under the system "TUFICANI" would indicate a maximum altitude of 3600 feet; "TUTARY" one of 9200 feet; "TANNIN" one of 16,600 feet, etc.

13. The wind direction and velocity at the maximum altitude will be coded in the same manner as prescribed foregoing for other levels reported.

14. CLOUDS:- The amount, type and direction of movement of clouds observed will be reported in code in accordance with following:-

(a) The regular cloud code words on pages 59 and 60 of the 1931 Weather Code will be used except that the following words will be used for "Calm" and "Unknown":

CAIM

Cloud Type	1/10 or less	2 or 3 tenths	4 or 5 tenths	6 or 7 tenths	8, 9, or 10 tenths
Ci or Ci St	Cull	Curval	Curley	Cupid	Cuckoo
CI Cu or A Cu	Catch	Calvar	Cake	Caking	Callow
A St.	Cent	Cellar	Celeste	Ceiling	Cesspool
Cu	Circum	Cicala	Cicero	Cilium	Cinco
St Cu	Cocky	Collar	Copper	Coppice	Coco
St	Chilly	Choppage	Chopper	Choaking	Chico
Nb or Cu Nb.	Clanky	Clovak	Clapper	Craking	Crimpole
UNKNOWN.					
Ci or Ci St.	Cuzzy	Cuzald	Cuzel	Cuzilt	Cuzelp
Ci Cu or A Cu.	Cazy	Calzan	Cazell	Cazif	Cazole
A St.	Cezule	Cezave	Cezery	Cezist	Cezode
Cu.	Cirzule	Cizalm	Cilzer	Cipzil	Cilzor
St. Cu.	Cozup	Cozate	Cozener	Cozine	Cozorp
St.	Chozy	Chizam	Chazel	Chezipe	Chazop
Nb or Cu Nb.	Clazule	Clazart	Crazed	Clezir	Crazol

(b) Only one code word for upper and only one for lower clouds will be sent in any one observation, the predominant type and total amount of types of sky covered by all upper or lower clouds being enciphered in the code words for the respective groups.

(c) Not over ten-tenths of clouds will be reported in any observation.

(d) When both upper and lower clouds are reported the code word for the upper clouds will precede that for the lower clouds.

(e) Less than one-tenth of clouds of any type will not be reported, except when these may be entered by the balloon, in which case they are to be reported.

(f) When the movement of the clouds is unusually rapid, this fact will be indicated by adding "S" to the code word, except when the latter ends in "X" or "H", when "ES" will be added.

(g) When clouds are entered by the balloon and their height thus determined, this fact will be indicated by the entry of a code word, taken from the "River" code under "Falling" on pages 65-70 of the 1931 Weather Code (as prescribed for indicating maximum altitudes in paragraph 12 above) immediately following the cloud code word to which it refers. For example, "COMING TURNTABLES" would indicate 6/10 strato-cumulus from the south at an altitude (determined by the balloon entering them) of 9300 feet above sea level.

(h) Whenever the cloud elevation and maximum altitude reached are identical, the same altitude code word will be used at the proper places in the message.

(i) Mammato-cumulus or alto-cumulus castellatus clouds will not be reported separately but will be coded as cumulus and alto-cumulus respectively, when observed. Fracto-stratus will be coded as stratus.

15. NO OBSERVATION:- In case no observation is obtained for any reason, the following will be telegraphed:

- (a) Time (coded as per paragraph 4)
- (b) Station elevation (coded as per paragraph 5)
- (c) Surface data (coded as per paragraph 6)
- (d) Reason for no observation in plain English
- (e) The word "None"
- (f) Clouds, if any (coded as per paragraph 14)
- (g) Cloud altitude above sea level if determined (coded as per paragraph 14)

For example, using the same example as given under paragraph 19 of Section II:

QUACKMASTER JANUS DALE LOW CLOUDS NONE CHALDRONS TUNNELS.

16. Examples of reports follow:

Note:- Since these reports will be telegraphed, the station of origin will be shown in the superscript and it is not necessary to repeat this in the body of the message. Also, the reports are easily identified and no special identification word seems necessary. When decoded and placed on the teletype circuits, however, these items will

be entered by the official decoding the message in the proper order prescribed in Section II.

Note:- Letters in first columns below refer to same letters and data groups given in paragraph 3.

(A).

<u>Code Word</u>	<u>Translation</u>
(a). QUACKMASTER-----	5:00 a. m., local time.
(b). JANUS-----	Station elvn. 6100 feet.
(c). NAPKIN-----	Surface, southwest six.
(d). EIGHT-----	First level, 8000 feet.
(e). RASPBERRY-----	8000 feet, west fourteen.
RAFAEL-----	10,000 feet, west thirty two.
RIFENESS-----	12,000 feet, west northwest thirty four.
(f). TADDE-----	Max. Elvn., 12,400 feet, (no wind data as elevation less than 500 feet above last reg- ular level. This would <u>not</u> be entered in decoded report placed on teletype).
(g). CURATE-----	2/10 cirro-stratus, west.
CINNAMON-----	2/10 cumulus, southwest.

Written in body of telegraph message thus:

QUACKMASTER JANUS NAPKIN EIGHT RASPBERRY RAFAEL RIFENESS
TADDE CURATE CINNAMON.

(B).

<u>Code Word</u>	<u>Translation</u>
(a). QUARANTE-----	5:00 p. m., local time.
(b). JACK-----	Station elvn., zero.
(c). RACING-----	Surface, west six.
(d). TWO-----	First level, 2000 feet.
(e). RASPBERRY-----	2000 feet, west fourteen.
SABINE-----	4000 feet, northwest sixteen.
SABER-----	6000 feet, northwest fourteen.
(f). TUNNELS-----	Max. Elvn., 6500 feet.
SABULA-----	Wind at max. alt., northwest ten.
(g). CONSORT-----	8/10 strato-cumulus, north- west.
TUNNELS-----	Cloud altitude as determined by balloon entering them, 6500 feet.

Written in body of telegraph message thus:

QUARANTE JACK RACING TWO RASPBERRY SABINE SABER TUNNELS
SABULA CONSORT TUNNELS.

(c).

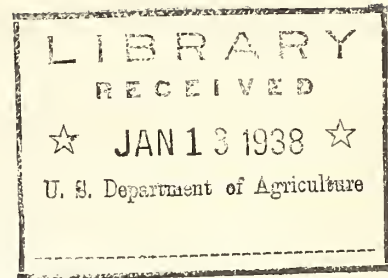
	<u>Code Word</u>	<u>Translation</u>
(a).	QUACKNUT-----	6:00 a. m., local time.
(b).	JASPOID-----	Station elvn., 800 feet.
(c).	FACADE-----	Surface, east two.
(d).	TWO-----	First level, 2000 feet.
(e).	FAVOR-----	2000 feet, east eight.
	GALENA-----	4000 feet, southeast four.
	GILBY-----	6000 feet, south southeast ten.
	MALTBY-----	8000 feet, south ten.
	MILITARY-----	10,000 feet, south southwest six.
	GILLOTE-----	12,000 feet, south southeast eight.
	MAYBE-----	14,000 feet, south fourteen.
(f).	TAMABLE-----	Max. alt., 15,200 feet.
	SAGE-----	Wind at max. alt., northwest forty four. These data sent as marked change in direc- tion and velocity occurred at less than 2000 feet above the 14,000-ft. level.
(g).	CURSINGS-----	6/10 cirro-stratus, northwest, moving unusually rapidly.

Written in body of telegraph message thus:

QUACKNUT JASPOID FACADE TWO FAVOR GALENA GILBY
MALTBY MILITARY GILLOTE MAYBE TAMABLE SAGE
CURSINGS.

W. R. Gregg,
Chief of Bureau.

1.9
W37 Int
1938



UNITED STATES DEPARTMENT OF AGRICULTURE

WEATHER BUREAU

WASHINGTON

Office of the Chief

February 1, 1938.

CIRCULAR

INSTRUCTIONS FOR REPORTING PILOT BALLOON OBSERVATIONS.

GENERAL INSTRUCTIONS

1. These instructions supersede similar instructions for the transmission of pilot balloon reports in the Circular dated February 1, 1936. The code used herein conforms closely with the International Code for reporting upper air winds, in that wind directions are reported to 36 compass points and the data for each level are reported by means of a number code of not more than 5 digits. These instructions are to become effective with the transmission of the 5.00 a.m. E.S.T. reports on February 1, 1938.

2. Collections of the reports will be made in sequence on teletype and radio circuits for all four (5:00 and 11:00 a.m. and p.m., E.S.T.) observations; the reports from stations on any one circuit being placed thereon in predetermined order. Relays, for the purpose of making the reports available to all Airway and District forecast centers, will then be made in accordance with the schedules arranged between the Bureau of Air Commerce and the Weather Bureau.

3. In order that all reports may be filed promptly, station officials are authorized to permit the starting of observations as early as 4:00 and 10: a.m. and p.m. E.S.T.

4. Off-airway pilot balloon stations at which no radio or teletype facilities are available, are to continue telegraphing their reports to nearby teletype or radio relay points as heretofore. Telegraphed reports must be filed sufficiently early to reach their respective teletype or radio relay points, prior to the time scheduled for their transmission by teletype or radio.

5. Stations receiving telegraphed reports will enter them in the predetermined places in the sequence collections.

6. When a pilot balloon report normally received at any point for transmission, is not available for transmission in the regular sequence collection, the call letters of the reports followed by the word "FINO" are to be entered in the sequence in place of the report.

7. Pilot balloon reports, available before the scheduled transmission time, may be sent ahead of the sequences by dispatch to the points needing them for airline operations. Reports of "delayed" observations are to be filed for transmission as D DW traffic.

8. In event of teletype or radio failure at the point of origin of any pilot balloon report, the report will be telegraphed to the nearest Weather Bureau Airport Station at which a Department of Commerce teletype relay office is located. The locations of the teletype relay points are given in Department of Commerce Circular No. 179, dated September 16, 1937. This applies as well to the transmission of reports received by telegraph which cannot be relayed because of teletype or radio failure.

DESCRIPTION OF CODE

9. All pilot balloon reports are to be sent by means of a number code wherein the wind data will be given by alternate groups of 5 and 4 digits each.

The number of groups representing the surface and even thousand foot levels will consist of 5 digits the first of which will indicate the level. The odd thousand foot levels will consist of 4 digits, the number indicating the level being omitted.

10. The data are to be given, insofar as they are available, for each thousand foot level above sea level up to and including 14,000 feet. Wind directions are to be given to 36 points, i. e., the direction in degrees (from North, i. e., 90°=E, 180°=S, etc.) divided by 10 and rounded to the nearest 10 degrees. Velocities are to be given in miles per hour.

11. Cloud data will not be included in these reports.

12. Complete reports will consist of the following: (a) station designation; (b) time; (c) surface wind data, and (d) wind data for each thousand-foot level, insofar as available, up to 14,000 feet above sea level.

13. STATION DESIGNATION - This will be the regular Bureau of Air Commerce two- or three-letter designation for the station concerned, i. e., CV for Cleveland; WA for Washington, etc.

14. TIME - 75th meridian time will be used for all pilot balloon reports and will be determined as follows: Add 20 minutes to the time of releasing the balloon. Change this to the nearest whole hour. Convert to 75th meridian time and then to the 24-hour clock. For example: Denver, Colo., balloon released at 3:12 p. m., 105th meridian time. Adding 20 minutes gives 3:32 p. m. The nearest hour would be 4:00 p. m., 105th meridian time, or 6:00 p. m., 75th meridian time, and 18:00 on the 24-hour clock. The value reported would, therefore, be "18". The purpose of adding 20 minutes to the time of the balloon's release is to indicate more nearly the mean time of the observation. Reports filed with local Bureau of Air Commerce operators for transmission will also have the local standard time of the balloon's release, plus 20 minutes indicated thereon for use in the radio broadcasts. In the example above, this time would be 3:32 p. m.

15. SURFACE WIND GROUP:- This will be a 5-digit group the first of which will always be zero such as "02216" which would indicate a surface wind direction of 220° (SW) and a velocity of 16 miles per hour.

16. UPPER AIR WIND DATA:- The wind direction and velocity for each thousand foot level above the sea level altitude of the station and up to 14,000 feet will be given in this part of the report. The first standard level for which wind data are to be given must be 200 or more feet above the sea-level elevation of the station theodolite platform. For example, if the sea-level elevation of the platform is 1820 feet the first level to be sent would be 3,000 feet but if the platform elevation is 1800 feet the first level to be sent would be 2,000 feet, etc.

17. The levels for which data are given will be indicated by a single digit, using the numbers 0-9 to indicate the thousand-foot levels and repeating the series of numbers for levels above 9,000 feet as follows:

<u>Number</u>		<u>Levels in Feet Above Sea Level</u>
0	-	Surface - 10,000 - 20,000
1	-	1000 - 11,000
2	-	2000 - 12,000
3	-	3000 - 13,000
4	-	4000 - 14,000
5	-	5000 - 15,000
6	-	6000 - 16,000
7	-	7000 - 17,000
8	-	8000 - 18,000
9	-	9000 - 19,000

In order to reduce the teletype sending time and also to facilitate the entering of these reports on aerological charts at District and airway forecast centers, the levels will be indicated for the surface and the even thousand-foot levels only.

18. Wind directions will be indicated by 2 digits (00-36) as follows:

<u>Code</u>	<u>Direction</u>	<u>Code</u>	<u>Direction</u>
<u>Figure</u>	<u>in Degrees</u>	<u>Figure</u>	<u>in Degrees</u>
00 - -	Calm	19 - -	186°-194°
01 - -	6°-14°	20 - -	195°-205°
02 - -	15°-25°	21 - -	206°-214°
03 - -	26°-34°	22 - -	215°-225°
04 - -	35°-45°	23 - -	226°-234°
05 - -	46°-54°	24 - -	235°-245°
06 - -	55°-65°	25 - -	246°-254°
07 - -	66°-74°	26 - -	255°-265°
08 - -	75°-85°	27 - -	266°-274°
09 - -	86°-94°	28 - -	275°-285°
10 - -	95°-105°	29 - -	286°-294°
11 - -	106°-114°	30 - -	295°-305°
12 - -	115°-125°	31 - -	306°-314°
13 - -	126°-134°	32 - -	315°-325°
14 - -	135°-145°	33 - -	326°-334°
15 - -	146°-154°	34 - -	335°-345°
16 - -	155°-165°	35 - -	346°-354°
17 - -	166°-174°	36 - -	355°- 5°
18 - -	175°-185°		

It will be noted that the above code figures may be determined by dividing the direction in degrees by 10 and disposing of decimals in accordance with the usual Weather Bureau rule wherein the decimal .5 is dropped from even numbers and adds one to odd numbers.

19. Wind velocities in miles per hour will be indicated directly by the last two digits of the number groups. For velocities of 100 m.p.h. or over, the direction numbers will be increased by 50 and the values above 100 indicated directly by the last 2 digits. For example to code a wind direction of 290° and velocity of 112 m.p.h at 8000 feet, add 50 to 29 (290° + 10) making it 79 and the complete group would be "87912".

20. MAXIMUM ALTITUDE DATA:- Maximum altitude wind data will not be sent for any level greater than 14,000 feet. When the maximum altitude is less than 14,000 feet data will be sent only when the altitude is 300 feet or less below a standard level in which case it will be coded for that standard level. Thus, a maximum altitude of 7,700 feet with a wind of 280° and 15 m.p.h. would be coded as "82815".

21. NO OBSERVATION:- In case an observation is not made or not received at point of transmission prior to the time of filing the report, a "no observation" report will be filed consisting of the following:

- (a) Station designation (as per paragraph 4).
- (b) Time (as per paragraph 5).
- (c) Reason for no observation - using one of the following words:

- CONO - (Low clouds, none)
- RANO - (Raining, none)
- SONO - (Snowing, none)
- FONO - (Foggy, none)
- KONO - (Smoky, none)
- IONO - (Instrument trouble, none)
- BANO - (No balloons, none)
- DUNO - (Thick dust, none)
- HYNO - (No hydrogen, none)
- FINO - (Not filed)

For example:

"CX05 CONO" would indicate that no observation was made at Cheyenne at 5:00 a.m., E.S.T., due to low clouds.

22. EXAMPLES OF REPORTS:-

A. Data:

- (a) Station - Cheyenne
- (b) Time - 3:22 p.m., 105th meridian
- (c) Surface wind 165°, 8 m.p.h. (at 6133 feet elevation)

(d)	7,000 feet	172°,	14 m.p.h.	
	8,000 "	175°,	16 " " "	
	9,000 "	185°,	20 " " "	
	10,000 "	195°,	22 " " "	
	11,000 "	214°,	20 " " "	
	12,000 "	235°,	17 " " "	
	12,720 "	248°,	25 " " "	(maximum altitude)

Coded Report:

CX18 01608 1714 81816 1820 02022 2120 22417 2525.

Note that in this report, the maximum altitude data would be sent as the maximum altitude is within 300 feet of the next standard level.

B. Data:

(a) Station - Buffalo

(b) Time - 10:40 a.m., 75th meridian.

(c) Surface wind - 230°, 18 m.p.h. (at 720 feet elevation)

(d)	1,000 feet	235°,	22 m.p.h.
	2,000 "	265°,	25 " " "
	3,000 "	272°,	28 " " "
	4,000 "	275°,	32 " " "
	5,000 "	282°,	44 " " "
	6,000 "	285°,	52 " " "
	7,000 "	288°,	67 " " "
	8,000 "	295°,	78 " " "
	9,000 "	304°,	87 " " "
	10,000 "	306°,	94 " " "
	11,000 "	315°,	102 " " "
	11,680 "	322°,	108 " " " (maximum altitude)

Coded Report:

BJ11 02318 2422 22625 2728 42832 2844 62852 2967 83078 3087
03194 8202.

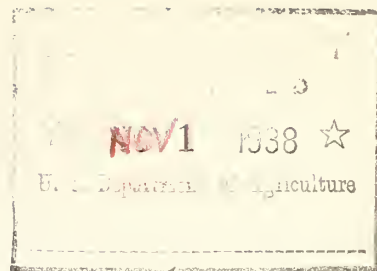
Note that the maximum altitude data would not be sent in this case as the maximum altitude is more than 300 feet below the next standard level.

23. TELEGRAPHIC FORM:- Telegraphed reports will be coded in the same manner as described above except that it will not be necessary to enter the station call letters in the body of the message as the point of origin will be evident on such reports. Such messages would therefore begin with a

two-number group indicating the time i.e. "05", "11", "17", etc. For example, if the message in Example "A" (paragraph 22) were sent by telegraph it would be written as follows: "17 01608 1714" -----etc. Stations receiving such reports will add the call letters before retransmitting them by teletype or radio.

W. R. Gregg,
Chief of Bureau.

1.9
W37 Int.



UNITED STATES DEPARTMENT OF AGRICULTURE

WEATHER BUREAU

WASHINGTON

Office of the Chief

November 1, 1938.

CIRCULAR

INSTRUCTIONS FOR REPORTING PILOT BALLOON OBSERVATIONS.

GENERAL INSTRUCTIONS

1. These instructions supersede similar instructions for the transmission of pilot balloon reports in the Circular dated February 1, 1936. The code used herein conforms closely with the International Code for reporting upper air winds, in that wind directions are reported to 36 compass points and the data for each level are reported by means of a number code of not more than 5 digits. These instructions are to become effective with the transmission of the 5.00 a.m. E.S.T. reports on February 1, 1938.

2. Collections of the reports will be made in sequence on teletype and radio circuits for all four (5:00 and 11:00 a.m. and p.m., E.S.T.) observations; the reports from stations on any one circuit being placed thereon in predetermined order. Relays, for the purpose of making the reports available to all Airway and District forecast centers, will then be made in accordance with the schedules arranged between the Bureau of Air Commerce and the Weather Bureau.

3. In order that all reports may be filed promptly, station officials are authorized to permit the starting of observations as early as 4:00 and 10: a.m. and p.m. E.S.T.

4. Off-airway pilot balloon stations at which no radio or teletype facilities are available, are to continue telegraphing their reports to nearby teletype or radio relay points as heretofore. Telegraphed reports must be filed sufficiently early to reach their respective teletype or radio relay points, prior to the time scheduled for their transmission by teletype or radio.

5. Stations receiving telegraphed reports will enter them in the predetermined places in the sequence collections.

6. When a pilot balloon report normally received at any point for transmission, is not available for transmission in the regular sequence collection, the call letters of the reports followed by the word "FINO" are to be entered in the sequence in place of the report.

7. Pilot balloon reports, available before the scheduled transmission time, may be sent ahead of the sequences by dispatch to the points needing them for airline operations. Reports of "delayed" observations are to be filed for transmission as D DW traffic.

8. In event of teletype or radio failure at the point of origin of any pilot balloon report, the report will be telegraphed to the nearest Weather Bureau Airport Station at which a Department of Commerce teletype relay office is located. The locations of the teletype relay points are given in Department of Commerce Circular No. 179, dated September 16, 1937. This applies as well to the transmission of reports received by telegraph which cannot be relayed because of teletype or radio failure.

DESCRIPTION OF CODE

9. All pilot balloon reports are to be sent by means of a number code wherein the wind data will be given by alternate groups of 5 and 4 digits each.

The number of groups representing the surface and even thousand foot levels will consist of 5 digits the first of which will indicate the level. The odd thousand foot levels will consist of 4 digits, the number indicating the level being omitted.

10. The data are to be given, insofar as they are available, for each thousand foot level above sea level up to and including 14,000 feet. Wind directions are to be given to 36 points, i. e., the direction in degrees (from North, i. e., 90° =E, 180° =S, etc.) divided by 10 and rounded to the nearest 10 degrees. Velocities are to be given in miles per hour.

11. Cloud data will not be included in these reports.

12. Complete reports will consist of the following: (a) station designation; (b) time; (c) surface wind data, and (d) wind data for each thousand-foot level, insofar as available, up to 14,000 feet above sea level.

13. STATION DESIGNATION - This will be the regular Bureau of Air Commerce two- or three-letter designation for the station concerned, i. e., CV for Cleveland; WA for Washington, etc.

14. TIME - 75th meridian time will be used for all pilot balloon reports and will be determined as follows: Add 20 minutes to the time of releasing the balloon. Change this to the nearest whole hour. Convert to 75th meridian time and then to the 24-hour clock. For example: Denver, Colo., balloon released at 3:12 p. m., 105th meridian time. Adding 20 minutes gives 3:32 p. m. The nearest hour would be 4:00 p. m., 105th meridian time, or 6:00 p. m., 75th meridian time, and 18:00 on the 24-hour clock. The value reported would, therefore, be "18". The purpose of adding 20 minutes to the time of the balloon's release is to indicate more nearly the mean time of the observation. Reports filed with local Bureau of Air Commerce operators for transmission will also have the local standard time of the balloon's release, plus 20 minutes indicated thereon for use in the radio broadcasts. In the example above, this time would be 3:32 p. m.

15. SURFACE WIND GROUP:- This will be a 5-digit group the first of which will always be zero such as "02216" which would indicate a surface wind direction of 220° (SW) and a velocity of 16 miles per hour.

16. UPPER AIR WIND DATA:- The wind direction and velocity for each thousand foot level above the sea level altitude of the station and up to 14,000 feet will be given in this part of the report. The first standard level for which wind data are to be given must be 200 or more feet above the sea-level elevation of the station theodolite platform. For example, if the sea-level elevation of the platform is 1820 feet the first level to be sent would be 3,000 feet but if the platform elevation is 1800 feet the first level to be sent would be 2,000 feet, etc.

17. The levels for which data are given will be indicated by a single digit, using the numbers 0-9 to indicate the thousand-foot levels and repeating the series of numbers for levels above 9,000 feet as follows:

<u>Number</u>		<u>Levels in Feet Above Sea Level</u>
0	-	Surface - 10,000 - 20,000
1	-	1000 - 11,000
2	-	2000 - 12,000
3	-	3000 - 13,000
4	-	4000 - 14,000
5	-	5000 - 15,000
6	-	6000 - 16,000
7	-	7000 - 17,000
8	-	8000 - 18,000
9	-	9000 - 19,000

In order to reduce the teletype sending time and also to facilitate the entering of these reports on aerological charts at District and airway forecast centers, the levels will be indicated for the surface and the even thousand-foot levels only.

18. Wind directions will be indicated by 2 digits (00-36) as follows:

<u>Code</u>	<u>Direction</u>	<u>Code</u>	<u>Direction</u>
<u>Figure</u>	<u>in Degrees</u>	<u>Figure</u>	<u>in Degrees</u>
00 - -	Calm	19 - -	186°-194°
01 - -	6°-14°	20 - -	195°-205°
02 - -	15°-25°	21 - -	206°-214°
03 - -	26°-34°	22 - -	215°-225°
04 - -	35°-45°	23 - -	226°-234°
05 - -	46°-54°	24 - -	235°-245°
06 - -	55°-65°	25 - -	246°-254°
07 - -	66°-74°	26 - -	255°-265°
08 - -	75°-85°	27 - -	266°-274°
09 - -	86°-94°	28 - -	275°-285°
10 - -	95°-105°	29 - -	286°-294°
11 - -	106°-114°	30 - -	295°-305°
12 - -	115°-125°	31 - -	306°-314°
13 - -	126°-134°	32 - -	315°-325°
14 - -	135°-145°	33 - -	326°-334°
15 - -	146°-154°	34 - -	335°-345°
16 - -	155°-165°	35 - -	346°-354°
17 - -	166°-174°	36 - -	355°- 5°
18 - -	175°-185°		

It will be noted that the above code figures may be determined by dividing the direction in degrees by 10 and disposing of decimals in accordance with the usual Weather Bureau rule wherein the decimal .5 is dropped from even numbers and adds one to odd numbers.

19. Wind velocities in miles per hour will be indicated directly by the last two digits of the number groups. For velocities of 100 m.p.h. or over, the direction numbers will be increased by 50 and the values above 100 indicated directly by the last 2 digits. For example to code a wind direction of 290° and velocity of 112 m.p.h. at 8000 feet, add 50 to 29 (290° ÷ 10) making it 79 and the complete group would be "87912".

20. MAXIMUM ALTITUDE DATA:- Maximum altitude wind data will not be sent for any level greater than 14,000 feet. When the maximum altitude is less than 14,000 feet data will be sent only when the altitude is 300 feet or less below a standard level in which case it will be coded for that standard level. Thus, a maximum altitude of 7,700 feet with a wind of 280° and 15 m.p.h. would be coded as "82815".

21. NO OBSERVATION:- In case an observation is not made or not received at point of transmission prior to the time of filing the report, a "no observation" report will be filed consisting of the following:

- (a) Station designation (as per paragraph 4).
- (b) Time (as per paragraph 5).
- (c) Reason for no observation - using one of the following words:
 - CONO - (Low clouds, none)
 - RANO - (Raining, none)
 - SONO - (Snowing, none)
 - FONO - (Foggy, none)
 - KONO - (Smoky, none)
 - IONO - (Instrument trouble, none)
 - BANO - (No balloons, none)
 - DUNO - (Thick dust, none)
 - HYNO - (No hydrogen, none)
 - FINO - (Not filed)

For example:

"CX05 CONO" would indicate that no observation was made at Cheyenne at 5:00 a.m., E.S.T., due to low clouds.

22. EXAMPLES OF REPORTS:-

A. Data:

- (a) Station - Cheyenne
- (b) Time - 3:22 p.m., 105th meridian
- (c) Surface wind 165°, 8 m.p.h. (at 6133 feet elevation)

(d)	7,000 feet	172°	14 m.p.h.	
	8,000 "	175°	16 " " "	
	9,000 "	185°	20 " " "	
	10,000 "	195°	22 " " "	
	11,000 "	214°	20 " " "	
	12,000 "	235°	17 " " "	
	12,720 "	248°	25 " " "	(maximum altitude)

Coded Report:

CX18 01608 1714 81816 1820 02022 2120 22417 2525.

Note that in this report, the maximum altitude data would be sent as the maximum altitude is within 300 feet of the next standard level.

B. Data:

(a) Station - Buffalo

(b) Time - 10:40 a.m., 75th meridian.

(c) Surface wind - 230°, 18 m.p.h. (at 720 feet elevation)

(d)	1,000 feet	235°	22 m.p.h.
	2,000 "	265°	25 " " "
	3,000 "	272°	28 " " "
	4,000 "	275°	32 " " "
	5,000 "	282°	44 " " "
	6,000 "	285°	52 " " "
	7,000 "	288°	67 " " "
	8,000 "	295°	78 " " "
	9,000 "	304°	87 " " "
	10,000 "	306°	94 " " "
	11,000 "	315°	102 " " "
	11,680 "	322°	108 " " " (maximum altitude)

Coded Report:

BJ11 02318 2422 22625 2728 42832 2844 62852 2967 83078 3087
03194 8202.

Note that the maximum altitude data would not be sent in this case at the maximum altitude is more than 300 feet below the next standard level.

23. TELEGRAPHIC FORM:-- Telegraphed reports will be coded in the same manner as described above except that it will not be necessary to enter the station call letters in the body of the message as the point of origin will be evident on such reports. Such messages would therefore begin with a

two-number group indicating the time i.e. "05", "11", "17", etc. For example, if the message in Example "A" (paragraph 22) were sent by telegraph it would be written as follows: "18 01608 1714" -----etc. Stations receiving such reports will add the call letters before retransmitting them by teletype or radio.

C. C. Clark
Acting Chief of Bureau.